

# The INEEL Water Integration Project: Coordinating Surface Water, Vadose Zone and Groundwater Activities

The Snake River Plain Aquifer has been a reliable source of water for human and ecological communities for thousands of years. The fractured volcanic basalt underlying the Snake River Plain is saturated like a sponge with more than a billion acre-feet of water and covers more than 10,000 square miles. The aquifer moves at an average of 5-10 feet per day. An abundant and renewable water resource, the aquifer supports the irrigation needs of hundreds of Idaho farm families and is the sole source of drinking water for 200,000 people in southeast Idaho. The nation's largest trout farming industry relies on the high-quality water that enters the Snake River at Thousand Springs near Hagerman, as do numerous aquatic species native to the river canyon.

The U.S. Department of Energy (DOE) recognizes the priceless value of the Snake River Plain Aquifer and its responsibility to ensure that contamination levels from activities at the Idaho National Engineering and Environmental Laboratory (INEEL) do not exceed established standards for groundwater quality.

Since it was established in 1949, the INEEL has produced and received quantities of industrial and radioactive wastes that were disposed of on Site. Solid wastes most often were buried in shallow trenches, and liquids often were injected directly to the aquifer. While many of these techniques were deemed acceptable through the early 1970s, INEEL operating procedures have now eliminated or modified these disposal practices. Today, five plumes of organic and radioactive contamination still reside below the surface of the INEEL as a product of past disposal practices.

INEEL cleanup activities have reduced contaminant concentrations in the plumes, and regulatory agencies are monitoring the natural processes of radioactive decay and chemical



breakdown of the hazardous substances. Monitoring results show that no contamination exceeding drinking water standards has moved beyond the site boundaries, or is predicted to do so in the near future.

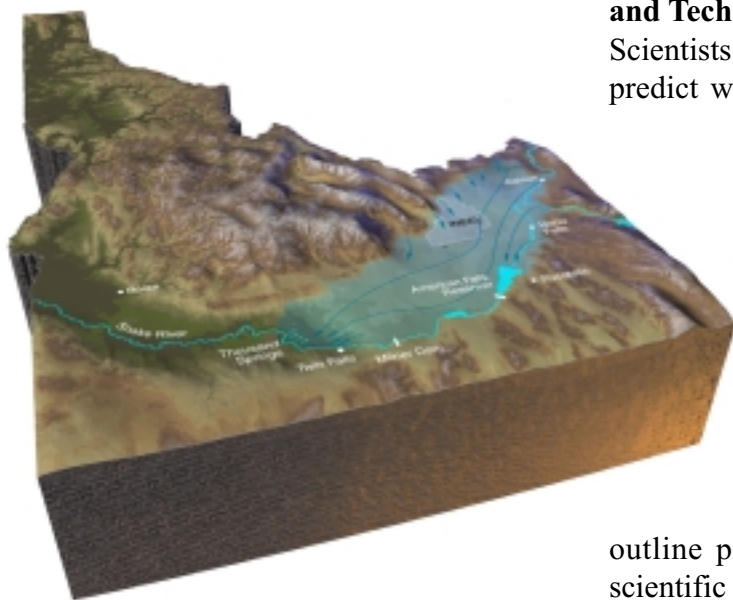
Despite the success of many cleanup technologies such as bioremediation, a number of waste cleanup challenges remain at the INEEL. The DOE has signed an agreement with the state of Idaho and the Environmental Protection Agency to reduce to an acceptable level the risks posed by the

remaining contaminated areas. To fulfill this agreement, the INEEL is seeking to improve its understanding of how contaminants move through the INEEL vadose zone – the complex, geologic region that lies between the land surface and the groundwater table. The INEEL Water Integration Project plays an important part in developing and conveying this understanding.

## Integrating Science, Technology and Cleanup Applications

The INEEL Water Integration Project is a three-year project designed to:

- Enhance scientific understanding of surface water, groundwater, and contaminant movement at the INEEL.
- Improve the technical basis for making cleanup decisions.
- Strengthen and better coordinate groundwater and vadose zone monitoring programs.



Four primary products are anticipated from the INEEL Water Integration Project:

### 1. Conceptual Model of the INEEL Subsurface

Various conceptual models depict important geologic and hydrologic features of the INEEL landscape and its subsurface environment. These models constantly are being improved to better predict how water and contaminants may move from the surface through the vadose zone toward the aquifer.

The goal of the INEEL Water Integration Project is to have one conceptual model agreed on by scientists, managers and regulators. Several conceptual models of the INEEL subsurface will be summarized into one document by the end of 2002 with intra-INEEL, interagency, and stakeholder participation. Once agreement on the conceptual model is achieved, enhancement of mathematical models describing subsurface contaminant transport will follow.

### 2. INEEL Vadose Zone/Groundwater Science and Technology Roadmap

Scientists are seeking to improve their ability to predict with greater accuracy the movement of water and contaminants beneath the INEEL. Areas where they would like to improve understanding include geosciences, microbiology, flow and transport mechanisms, source term concerns and contaminant behavior.

The revised INEEL Vadose Zone/Groundwater Roadmap will outline priorities for resolving the remaining scientific and technical questions that would lead

to more cost-effective clean-up. Review by stakeholders will be important to ensure that the public's perspective is included in the strategies. Following the Roadmap's completion in 2002, the science and technology strategies will be peer-reviewed thoroughly by scientific experts who will provide technical direction to the INEEL Water Integration Project.

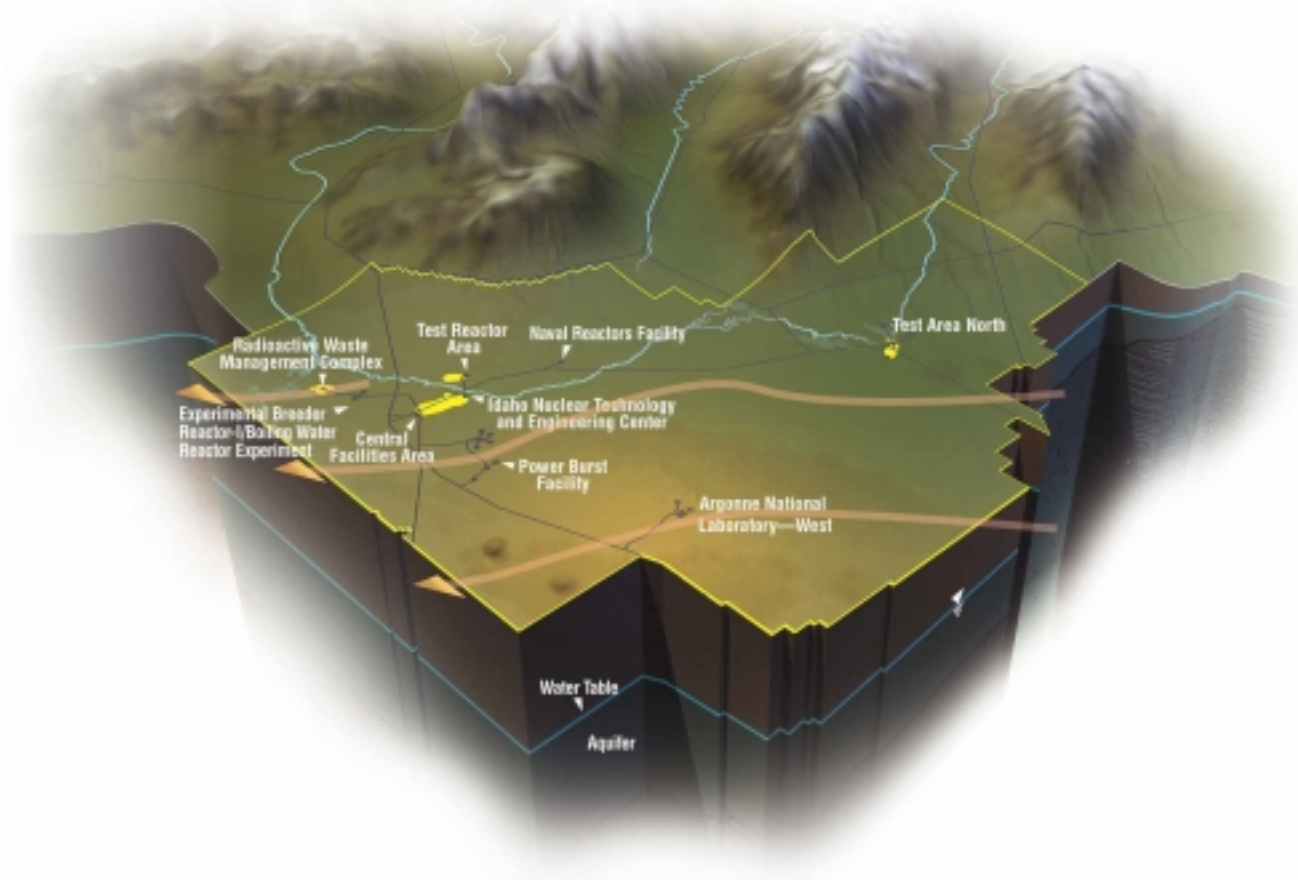
### 3. Subsurface Information Electronic Library

A standard architecture for an INEEL Subsurface Information Electronic Library will be identified during the project's first year. The computer systems needed to run the electronic library will be acquired in 2003 and configured to allow for web-based access to the library. In 2004, identified data sets will be configured to match

the library's electronic architecture and the job of loading the data sets in the library will begin. The entire electronic library will be developed to extend library access to as many stakeholders as possible.

### 4. Coordinated Monitoring Programs

The INEEL Water Integration Project seeks to improve coordination of INEEL's various groundwater and vadose zone monitoring activities to ensure their overall effectiveness and to better interpret and communicate results. Increased collaboration among agencies responsible for both on-Site and off-Site monitoring will enhance the exchange of monitoring data and lead to a better understanding of how contaminants move through the INEEL subsurface.



## Interagency and Citizen Involvement

A fundamental premise of the INEEL Water Integration Project is that participation by a wide range of stakeholders will improve the final project results. A “Stakeholder Involvement Plan” has been prepared to outline how citizens, organizations and other government agencies may participate in project activities and influence project outcomes. The project team will be reaching out to interested individuals and communities over the next 2-1/2 years to increase public understanding of subsurface contamination at the INEEL and to hear a variety of perspectives on resolving research challenges.

The INEEL Water Integration Project team has committed to these specific objectives for its public involvement process:

- Better understand the values, attitudes and diversity of INEEL stakeholders and integrate discussion of these values into the project’s decision-making.
- Ensure that responsive two-way communications are maintained and that project information is readily accessible to interested citizens and organizations.
- Involve stakeholders early in the process to ensure that decisions benefit from the added value of public wisdom and perspective.
- Involve the public in characterizing project related problems and issues and in suggesting approaches to their resolution. The INEEL will clarify where stakeholder perspectives will be most influential in shaping project decisions.
- Increase public understanding of the natural and institutional environment in which the project operates, including scientific and technical uncertainties. This dynamic arena includes the legal, regulatory, political and budgetary realities that are always subject to change.

Weekly meetings of the INEEL Water Integration Project Team are open to the public. They are held each Wednesday at 1:00 p.m. at the DOE-North Building at 850 Energy Drive in Idaho Falls. Because escort is required in this building, please call Brad Bugger at (208) 526-0833 to let him know you will be attending. If you cannot attend in person, you may call (208) 526-0683 to participate in the discussions.

**Information on the INEEL Water Integration Project is available at:**  
[www.inel.gov/environment/water/](http://www.inel.gov/environment/water/)

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